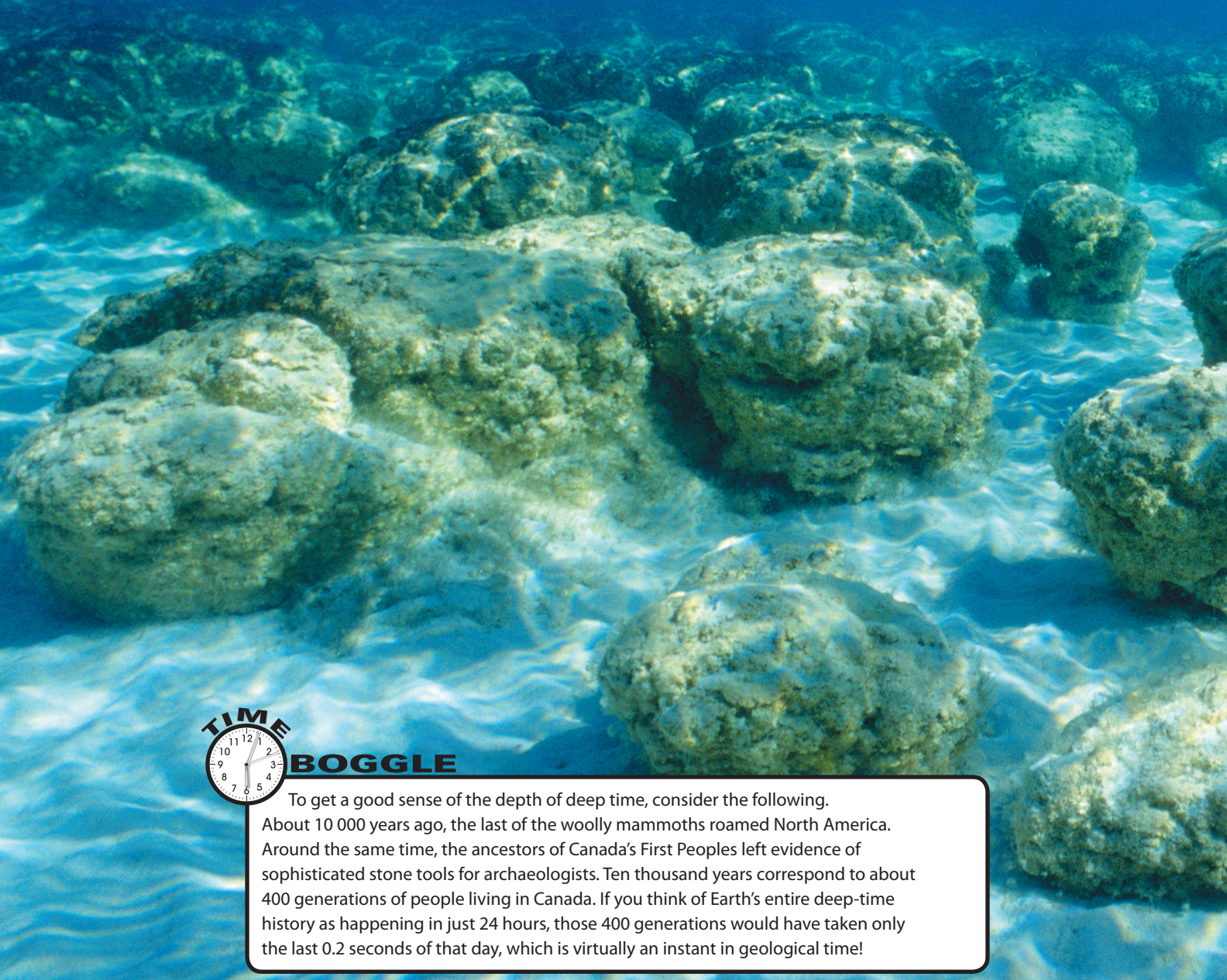
Chapter 1 The Abyss of Time

Your road trip begins at Drywood Creek in southern Alberta, just north of Waterton Lakes National Park. There you can see a large fossilized reef made up of fossils called stromatolites. These fossils might not look like much, but their presence in Drywood Creek—and in many rock formations in the Rocky Mountains—can be used to map out Alberta's coastline over a billion years ago. At that time, British Columbia didn't exist.

Living versions of the bacteria that created Alberta's stromatolites are found at Shark Bay, a popular tourist destination in Western Australia. By studying the modern forms of the bacteria that created the stromatolites, scientists know that these bacteria can survive only in hot, tropical coastal pools like those found by Shark Bay. This suggests that the climate in western Australia today is similar to Alberta's climate of a billion years ago. Although it may seem impossible, this fossil evidence indicates that the Rocky Mountain Range runs along what used to be Alberta's ancient coastline. Alberta is one of the rare places in the world where you can explore the mystery of how a sunny coast can become a snowy inland mountain range.



BOGGLE

To get a good sense of the depth of deep time, consider the following. About 10 000 years ago, the last of the woolly mammoths roamed North America. Around the same time, the ancestors of Canada's First Peoples left evidence of sophisticated stone tools for archaeologists. Ten thousand years correspond to about 400 generations of people living in Canada. If you think of Earth's entire deep-time history as happening in just 24 hours, those 400 generations would have taken only the last 0.2 seconds of that day, which is virtually an instant in geological time!

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Try This Activity

Deep Time

Scientists generally agree that Earth is approximately 4.5 billion years old. During this activity you will explore what this means and the concept of deep time.

Science Skills

✓ Performing and Recording

Materials

- handout
- metre-stick
- scissors
- spool of cash-register tape
- glue

deep time: the theory that Earth has a long history of development and change lasting billions of years

Procedure

step 1: Obtain "Significant Events in Earth's History." This list is available on the Science 20 Textbook CD. Use scissors to cut out each event.

step 2: Measure out 5 m of cash-register tape to represent 4.5 billion years of Earth's history. Using the metre-stick, divide the tape into 10-cm sections. Starting from 4500 mya (million years ago), label each 10-cm section as 100 million years of time until you get to zero (the present).

step 3: Label Precambrian Era (4.5 billion years ago to 590 million years ago) on your time line.

step 4: Paste each event on the time line at the appropriate spot.

Analysis

1. Describe how the events are distributed along your time line.
2. Determine the percentage of Earth's history taken up by the Precambrian Era.
3. Enumerate the events on your time line that occurred during the Precambrian Era.

Evaluation

4. Why do you think so little seems to have happened in the first 90% of Earth's history?

This unit is divided into three chapters that follow the major eras of geological time. It's a good idea to construct a separate time line for each chapter. First, create a format and scale that will fit onto a sheet of paper you can keep in your binder. Next, every time you see the time line icon, add the event to your time line for that chapter. Once you're done you'll have a very handy study guide.